

Effect of Medical Students' Experiences With Residents as Teachers on Clerkship Assessment

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Abstract

Background We assessed the impact of resident teaching in medical students' overall assessment of an obstetrics and gynecology clerkship.

Methods Between September 2007 and March 2010, third-year medical students completed a questionnaire at the end of their clerkship. Questions covered the number of topics they recalled learning about from residents, perceptions of the quality of education received from residents, perceptions of the experience with the residents as teachers, and overall rating of the obstetrics and gynecology clerkship.

Results Questionnaires were completed by all medical students ($N = 74$), with 63 students returning complete surveys. There was a small correlation between the number of topics students recalled learning about from residents and ratings of quality of education ($r = 0.249$, $P = .03$), a small correlation between the number of topics students recalled learning about from residents

and level of satisfaction with the clerkship ($r = 0.262$, $P = .04$), and a larger correlation between assessment of the overall experience with residents as teachers and ratings of quality of education received from residents ($r = 0.687$, $P < .001$). Overall experience with residents as teachers and perceived quality of education from residents were both associated with satisfaction with the clerkship ($r = 0.756$, $P < .001$ and $r = 0.603$, $P < .001$, respectively). A regression model with these variables accounted for 58% of the variability in students' ratings of the clerkship ($F = 27.103$, $P < .001$, $R = .761$, $R^2 = .579$). The only significant independent variable was assessment of the overall experience with residents as teachers ($t = 5.350$, $P < .001$).

Conclusion Quality of interactions between residents and medical students is a key factor in medical students' assessment of their clerkship.

Background

Medical students' assessment of their educational experiences in third-year clerkships is dependent on multiple factors, including organizational variables, perceived improvement in clinical skills, supervision, and resident availability.¹⁻⁵ Factors related to the structure of the

program and processes of learning have been found to be the best predictor of students' global satisfaction with a clerkship.⁴ Time spent in contact with patients is positively related to students' perception of the quality of their learning environment.⁵ In addition to these attributes of the clerkship, interaction with residents is important in assessment of the quality of the clerkship.^{1,2} A 9-year study examined medical students' global assessment of 7 clerkships with a 22-item assessment of attributes of the clerkship.² Results of 2450 evaluations found that availability of residents was a significant factor in the global assessment of each of the 7 clerkships.² The role that interactions with residents plays in evaluating clerkships is likely to be of continuing importance, as time demands and economic pressures on attending physicians often result in increased emphasis on using residents as teachers.⁶

Interactions between residents and students differ from those between students and faculty.^{2,7,8} Residents may offer different teaching opportunities than attending physicians; a study of medical students' evaluation of resident and attending physician teaching in an obstetrics and gynecology clerkship found students performed significantly more Papanicolaou and pelvic and breast examinations

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during sessions with residents than with faculty.⁸ A study conducted from 1991 to 1995 of all third-year medical students who rotated through general surgery found that medical students’ overall satisfaction with the clerkship was not related to the volume of patients but was related to quality of teaching from resident and attending physicians.¹ Aspects of resident teaching that significantly contributed to explaining students’ overall assessment of the clerkship were residents respecting students, providing teaching experiences, and serving as role models.¹

Overall, however, medical students’ assessment of resident teaching could be improved; the 2009 Medical School Graduation Questionnaire⁹ found that the percentage of students who selected “agree” or “strongly agree” in response to the question, “Residents and fellows provided effective teaching during the clerkship” for family medicine, internal medicine, obstetrics and gynecology, and surgery was 59%, 86%, 65%, and 75%, respectively. These findings suggest that either amount of resident teaching or teaching effectiveness between residents and students could be improved.^{1,2} This study was designed to assess the role that quantity as well as quality of interactions plays in medical students’ global assessment of a clerkship. Given the important role that residents play in medical student education,⁶ determining which of these variables is most important to medical students can direct efforts to modify the curriculum that residents teach to medical students and/or the manner in which they teach.

Method

Third-year medical students who were finishing an obstetrics and gynecology (ob-gyn) clerkship at a community hospital affiliated with a medical school in the Midwest from September 2007 to March 2010 completed a survey on the last day of the clerkship. The Institutional Review Board granted a waiver for obtaining informed consent for this study. There are 16 ob-gyn residents in the program and approximately 40 third-year medical students rotate through the clerkship each year.

Survey

The survey was based on a review of the literature^{1,2,7,8} and input from resident and attending physicians. The items were developed by the authors, including the ob-gyn clerkship director for third-year medical students and the associate program director of the residency program. The items were pretested with medical students (who did not participate in the actual study) and residents and were modified slightly to improve clarity. A research design methodologist at the medical school then reviewed the survey, and further minor modifications to improve clarity were made. Students were first asked to check off topic areas they remembered learning about from residents. The 16 topics corresponded to course-learning objectives within the ob-gyn clerkship (TABLE 1). The question specified that the learning could have occurred in a question-and-answer format, small-group discussion,

TABLE 1 PROPORTION OF MEDICAL STUDENTS WHO REMEMBERED LEARNING ABOUT A TOPIC AREA FROM A RESIDENT	
Topic	Percentage
Preterm rupture of membranes	82
Ectopic pregnancy/abortions	80
Hypertensive disorders	78
Gestational diabetes	78
Obstetric hemorrhage	73
Sexually transmitted diseases	70
Contraceptive options	70
Preterm labor	69
Endometriosis	61
Uterine fibroids	57
Shoulder dystocia	53
Abnormal uterine bleeding	47
Pelvic masses	41
Urinary incontinence	39
Menopause	38
Domestic violence	12

one-on-one interactive conversation, or tutorial/lecture. They were asked to estimate the percentage of time that residents spent teaching them in 5 different formats: formal lectures, brief topic discussions, direct patient care, observing a resident perform a procedure, and performing a procedure under resident supervision.

Questions concerning medical students’ perception of quality of education received from residents, assessment of overall experiences with the residents as teachers, and rating of the overall clerkship followed (TABLE 2). Students rated the quality of education received from residents in the 5 teaching formats on a 5-point scale (1 = excellent, 5 = poor). They were asked their agreement with statements concerning their experiences with the residents as teachers by using a 5-point scale (1 = strongly agree, 5 = strongly disagree). A final question asked students to rate their overall level of satisfaction with the ob-gyn clerkship on a 5-point scale (1 = very satisfied, 5 = very dissatisfied). The 2-page questionnaire also asked about age and sex.

Data Analysis

Data were analyzed with SPSS version 15 (Chicago, IL). Analyses using the Pearson product moment correlation coefficient were used to investigate relationships among the variables. Multiple linear regression was used to identify

TABLE 2 OBSTETRICS AND GYNECOLOGY (OB-GYN) CLERKSHIP STUDENTS' RESPONSE TO SURVEY QUESTIONS (N = 74)

	Average Percentage, Mean \pm SEM	Average Score, Mean \pm SEM
Please recall the times you were taught by residents during your ob-gyn clerkship. Please estimate the percentage of time residents taught you by teaching:		
In formal lectures	28.5 \pm 2.4	
Through brief topic lectures	12.4 \pm 1.1	
By discussing direct patient care	29.2 \pm 2.0	
By observing a resident perform a procedure	22.0 \pm 1.9	
By performing a procedure while a resident watched	11.5 \pm 1.4	
Please rate the quality of education you received from the residents in the following areas. ^a		
Teaching in formal lectures		2.47 \pm 0.09
Teaching through brief topic lectures		2.45 \pm 0.12
Teaching by discussing direct patient care		1.89 \pm 0.11
Teaching by observing a resident perform a procedure		2.55 \pm 0.12
Teaching by performing a procedure while a resident watched		2.39 \pm 0.14
Please rate your agreement with the following statements concerning your overall experiences with residents as teachers (n = 69). ^b		
The residents made an effort to teach me		1.75 \pm 0.09
The residents spent an adequate amount of time teaching me		2.07 \pm 0.11
The residents presented information at a level I could understand		1.51 \pm 0.64
The residents treated me respectfully		1.75 \pm 0.10
The residents made me feel comfortable admitting knowledge gap		1.83 \pm 0.11
Please rate your level of satisfaction with ob-gyn clerkship in general (n = 63). ^c		1.54 \pm 0.08

Abbreviation: SEM, standard error of the mean.

^a 1 = excellent, 5 = poor.

^b 1 = strongly agree, 5 = strongly disagree.

^c 1 = very satisfied, 5 = very dissatisfied.

which variables were significant predictors of satisfaction with the ob-gyn clerkship. The number of topics students recalled learning about from residents was calculated and used as an estimate of the quantity of teaching received from residents. Each student's average score for quality of education received from residents, average of their assessment of their experiences with the residents as teachers, their single score for level of satisfaction with the ob-gyn clerkship, and number of topics they remembered learning about from residents were used to calculate correlation coefficients. These variables were used to develop a regression model to estimate their effect on students' overall assessment of the clerkship.

Results

During the time frame of the study, 74 students completed the clerkship and all completed the survey; 5 did not complete

page 2 of the questionnaire (experiences with the residents as teachers) and an additional 6 did not answer the last question (rate level of satisfaction with ob-gyn clerkship). Mean age of the students was 24.9 \pm 0.5 years (standard error of the mean) (range, 21–56 years); 50% were women.

The average number of topics students recalled learning about from residents was 9.5 \pm 0.4 (range, 1–16 topics). More than 50% of the students remembered learning about most of the topics from a resident; however, fewer than 50% remembered learning about domestic violence, abnormal uterine bleeding, urinary incontinence, menopause, and pelvic masses from a resident (TABLE 1).

Students reported learning from residents in a variety of formats (TABLE 2). Mean response to each of the questions on quality of education received from residents ranged from 1.89 to 2.55; mean response to each of the questions on experiences with the residents as teachers ranged from 1.51 to 2.07.

There was a small, but significant, correlation between the number of topics students recalled learning about from residents and ratings of quality of education received from residents ($r = 0.249$, $P = .03$), and a much larger correlation between assessment of experiences with residents as teachers and ratings of the quality of education received from residents ($r = 0.687$, $P < .001$). Positive experiences with residents as teachers and perceived quality of education from residents were both associated with satisfaction with the clerkship ($r = 0.756$, $P < .001$ and $r = 0.603$, $P < .001$, respectively).

A regression model with number of topics students recalled learning about from residents, quality of education received from residents, and assessment of experiences with the residents as teachers accounted for 58% of the variability in the ratings of the overall ob-gyn clerkship ($F = 27.103$, $P < .001$, $R = .761$, $R^2 = .579$). The only independent variable that was significant was assessment of experiences with residents as teachers ($t = 5.350$, $P < .001$).

Discussion

Positive experiences with residents as teachers and perceived quality of education from residents were both significantly associated with satisfaction with the clerkship, while satisfaction with the clerkship was marginally related to number of topics students recalled learning about from residents. The primary variable of importance identified in a regression model was experiences with the residents as teachers, suggesting the quality of interactions between residents and medical students is a key factor in medical students' assessment of their clerkship. These results may reflect the fact that students are able to obtain information about ob-gyn topics from a variety of sources, but may be fairly dependent on the ability and willingness of residents to teach key patient care skills.⁸

An important consideration is the value of medical students' assessment of their clerkship, which appears closely linked to their perception of quality of teaching from residents. Studies have outlined key components of clinical teaching excellence; however, the effect of excellent teaching on outcomes is less well explored.¹⁰ Although 1 study found a lack of correlation between medical students' ratings of resident teaching and their scores on the National Board of Medical Examiners Subject Examination post clerkship, the authors¹¹ speculated this examination did not capture the type of knowledge imparted to medical students from residents (routines and procedures). Supporting this interpretation is the finding that resident teaching behaviors evaluated by medical students were correlated with student improvement over the clerkship, as measured with a multidimensional performance score.¹² These results suggest that positive clinical interactions with residents increase medical students' clinical skills and their assessment of the clerkship; however, further research is needed to more

precisely document the outcome most affected by positive interactions between students and residents.

In this study, residents did not appear to be teaching several key course objectives (eg, domestic violence, menopause), and it is not possible to determine what variables contributed to the lack of discussion on these subjects; this area should be explored in future studies. While students may have access to this information from other sources, results from this study suggest that positive teaching interactions with residents are important to medical students and that efforts should be made to formalize the curriculum so that residents cover all course objectives. These areas can be taught within the context of direct patient care and may offer relevance to medical students in addition to formal didactics.

Limitations of this study include the low numbers from a single institution in a single residency program. However, the effect was quite large; 58% of the variability in medical students' assessment of the clerkship could be accounted for by their interactions with the residents, and the time frame of the study reduces the likelihood that the effects are due to specific residents. Resident teaching of medical students is considered important in this institution, and while there is no formalized curriculum in place, the importance given to teaching may have led to an increased importance of interactions with residents in the clerkship assessment. Given the small number of residents involved, and the teaching orientation of this hospital, this study should be conducted in other residency programs.

Our study could not determine whether the positive interactions were primarily due to interactions with a subset of residents who enjoy teaching and make efforts to reach out and teach students. Further research should attempt to identify particular teaching characteristics or skills that lead to positive experiences, and could include focus groups to specifically seek answers to these questions from medical students. An important improvement in this study would be an assessment of the amount of time that residents spend teaching medical students. These data could strengthen the argument that it is not time per se, but quality of interactions, that is important to the students. The finding that only 65% of medical students agreed or strongly agreed with the statement, "Residents and fellows provided effective teaching during the [obstetrics and gynecology] clerkship"⁹ suggests that resident teaching could be improved. Data from this study support the development of standardized curriculum to ensure the teaching of all key competencies and to improve the teaching behaviors of all residents. Given the likelihood that residents will continue to be a major source of teaching,⁶ and that many will teach after completing training, these efforts will have a significant impact on medical students' experiences in their clerkships and beyond.

Conclusion

Interactions between residents and medical students are very important in medical students' assessment of their clerkship. Data from this study suggest that some key course objectives are not systematically being taught by residents. Formalization of the curriculum that residents teach to medical students, as well as continued efforts to enhance teaching skills among residents, is warranted given the impact on medical students' perception of their clerkship experience.

References

- 1 Xu G, Wolfson P, Robeson M, Rodgers JF, Veloski JJ, Brigham TP. Students' satisfaction and perceptions of attending physicians' and residents' teaching role. *Am J Surg*. 1998;176(1):46–48.
- 2 Gerbase M, Germond M, Nendaz M, Vu N. When the evaluated becomes evaluator: what can we learn from students' experiences during clerkship? *Acad Med*. 2009;84(7):877–885.
- 3 O'Brien B, Cooke M, Irby DM. Perceptions and attributions of third-year student struggles in clerkships: do students and clerkship directors agree? *Acad Med*. 2007;82(10):970–978.
- 4 Durak HI, Vatansever K, van Dalen J, van der Vleuten C. Factors determining students' global satisfaction with clerkships: an analysis of a two year students' ratings database. *Adv Health Sci Educ Theory Pract*. 2008;13(4):495–502.
- 5 van Hell EA, Kuks JB, Cohen-Schotanus J. Time spent on clerkship activities by students in relation to their perceptions of learning environment quality. *Med Educ*. 2009;43(7):674–679.
- 6 Weissman MA, Bensinger L, Koestler JL. Resident as teacher: educating the educators. *Mt Sinai J Med*. 2006;73(8):1165–1169.
- 7 Elnicki DM, Cooper A. Medical students' perceptions of the elements of effective inpatient teaching by attending physicians and housestaff. *J Gen Med*. 2005;20(7):635–639.
- 8 Johnson NR, Chen J. Medical student evaluation of teaching quality between obstetrics and gynecology residents and faculty as clinical preceptors in ambulatory gynecology. *Am J Obstet Gynecol*. 2006;195(5):1479–1483.
- 9 Association of American Medical Colleges. The Medical School Graduation Questionnaire, All Schools Summary Final Report, 2009. <https://www.aamc.org/download/90054/data/gqfinalreport2009.pdf> Accessed June 28, 2011.
- 10 Irby DM, Papadakis M. Does good clinical teaching really make a difference? *Am J Med*. 2001;110(3):231–232.
- 11 Stern DT, Williams BC, Gill A, Gruppen LD, Woolliscroft JO, Grum CM. Is there a relationship between attending physicians' and residents' teaching skills and students' examination scores? *Acad Med*. 2000;75(11):1144–1146.
- 12 Roop SA, Pangaro L. Effect of clinical teaching on student performance during a medicine clerkship. *Am J Med*. 2001;110(3):205–209.